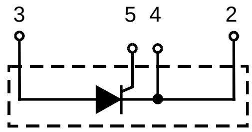
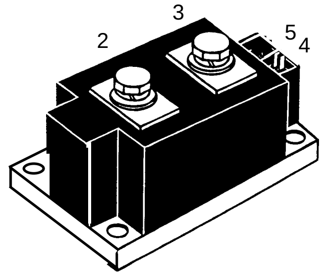
High Power Thyristor Modules

I_{TRMS} = 880 A
$I_{T(AV)M}$ = 560 A
V_{RRM} = 1200-1800 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
1300	1200	MCO 500-12io1
1500	1400	MCO 500-14io1
1700	1600	MCO 500-16io1
1900	1800	MCO 500-18io1





Symbol	Test Conditions		Maximum Ratings	
I_{TRMS}	$T_{VJ} = T_{VJM}$		880	A
$I_{T(AV)M}$	T_C = 85°C; 180° sine		560	A
I_{TSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz)	17000	A
	V_R = 0	t = 8.3 ms (60 Hz)	16000	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz)	13000	A
	V_R = 0	t = 8.3 ms (60 Hz)	14400	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz)	1445000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	1062000	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz)	845000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	813000	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f = 50 Hz, t_P = 200 µs	repetitive, I_T = 960 A	100	A/µs
	V_D = 2/3 V_{DRM} I_G = 1 A, di_G/dt = 1 A/µs	non repetitive, $I_T = I_{T(AV)M}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; V_{DR} = 2/3 V_{DRM} $R_{GK} = \infty$; method 1 (linear voltage rise)		1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_P = 30 µs	120	W
	$I_T = I_{T(AV)M}$	t_P = 500 µs	60	W
P_{GAV}			30	W
V_{RGM}			10	V
T_{VJ}			-40...140	°C
T_{VJM}			140	°C
T_{stg}			-40...125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque (M6)		4.5-7/40-62	Nm/lb.in.
	Terminal connection torque (M8)		11-13/97-115	Nm/lb.in.
Weight	Typical including screws		650	g

Data according to IEC 60747 refer to a single thyristor/diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

Features
- International standard package
- Direct copper bonded Al_2O_3-ceramic with copper base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered E 72873
- Keyed gate/cathode twin pins

Applications
- Motor control, softstarter
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Solid state switches

Advantages
- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

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Symbol	Test Conditions	Characteristic Values	
I_{RRM}	T_{VJ} = T_{VJM}; V_R = V_{RRM}	40	mA
V_T	I_T = 1200 A; T_{VJ} = 25°C	1.3	V
V_{T0} r_T	For power-loss calculations only (T_{VJ} = T_{VJM})	0.8 0.38	V mΩ
V_{GT} I_{GT}	V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C	2 3 300 400	V V mA mA
V_{GD} I_{GD}	T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM} T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}	0.25 10	V mA
I_L	T_{VJ} = 25°C; V_D = 6 V; t_P = 30 µs di_G/dt = 1 A/µs; I_G = 1 A	400	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞	300	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} di_G/dt = 1 A/µs; I_G = 1 A	2	µs
t_q	T_{VJ} = T_{VJM}; V_R = 100 V; V_D = 2/3 V_{DRM}; t_P = 200 µs dv/dt = 50 V/µs; I_T = 500 A; -di/dt = 10 A/µs	typ. 350	µs
R_{thJC} R_{thJK}	DC current DC current	0.072 0.096	K/W K/W
d_S d_A a	Creeping distance on surface Creepage distance in air Maximum allowable acceleration	12.7 9.6 50	mm mm m/s^2

Optional accessories for modules
Keyed Gate/Cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **ZY 180 L** (L = Left for pin pair 4/5) { UL 758, style 1385, CSA class 5851, guide 460-1-1

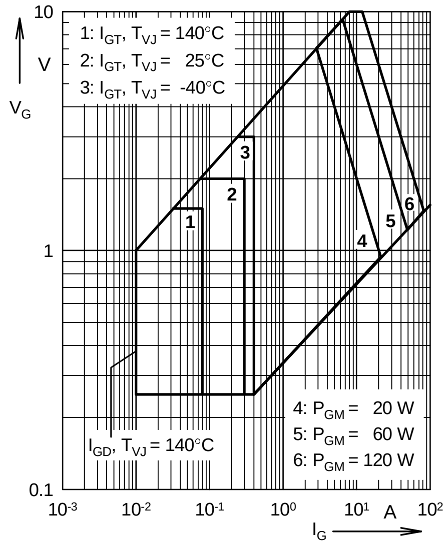


Fig. 1 Gate trigger characteristics

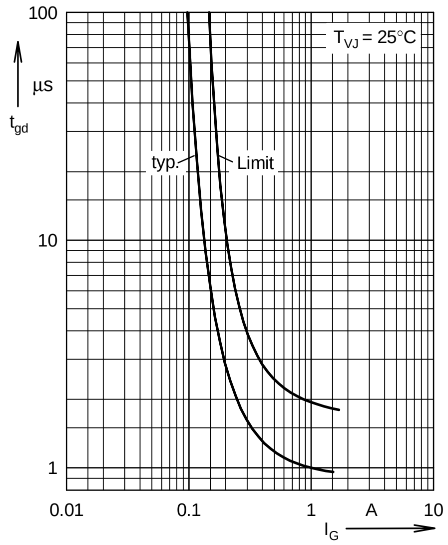
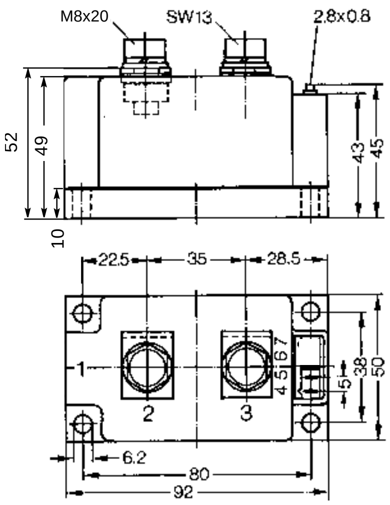


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")



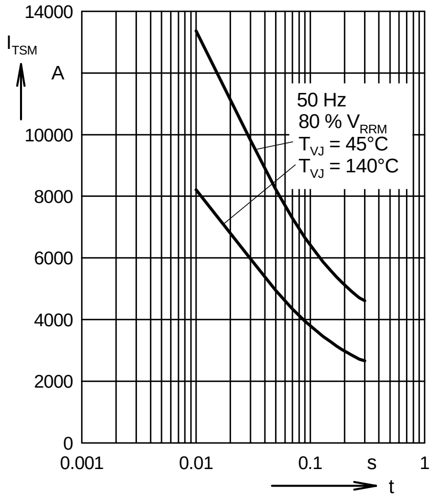


Fig. 3 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

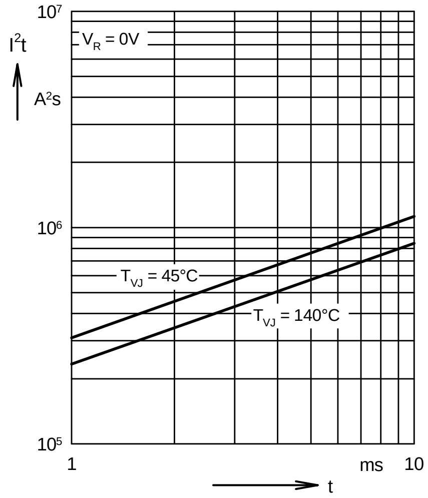


Fig. 4 ∫i²dt versus time (1-10 ms)

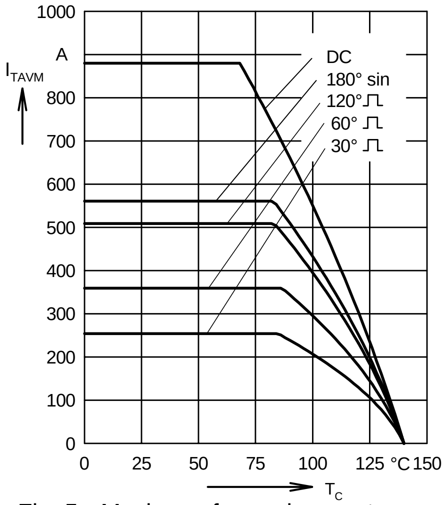


Fig. 5 Maximum forward current at case temperature

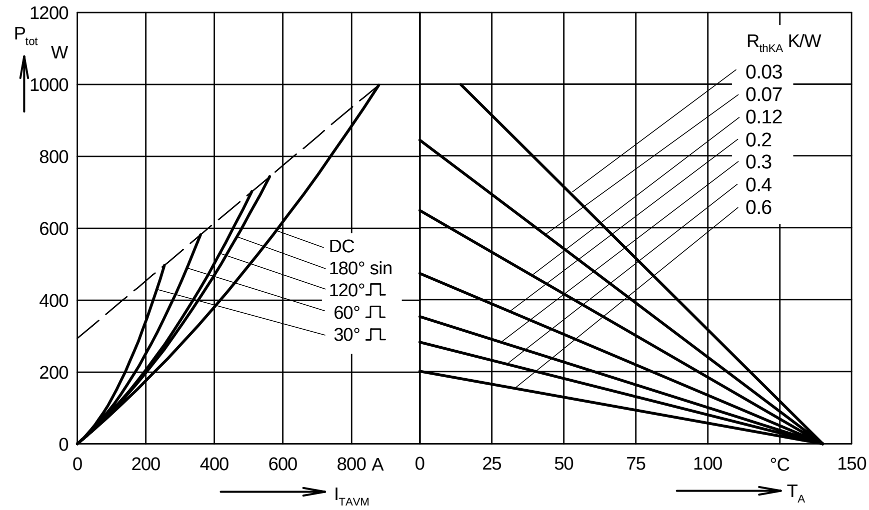


Fig. 6 Power dissipation versus on-state current and ambient temperature

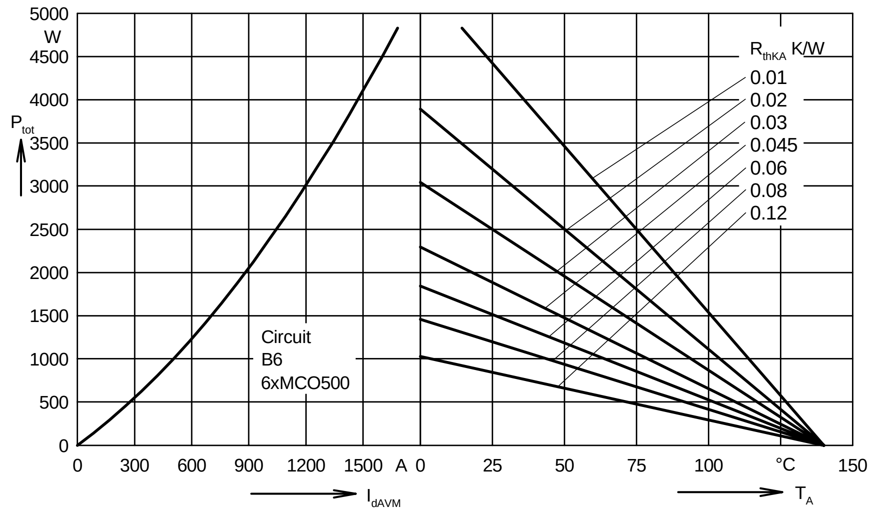


Fig. 7 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

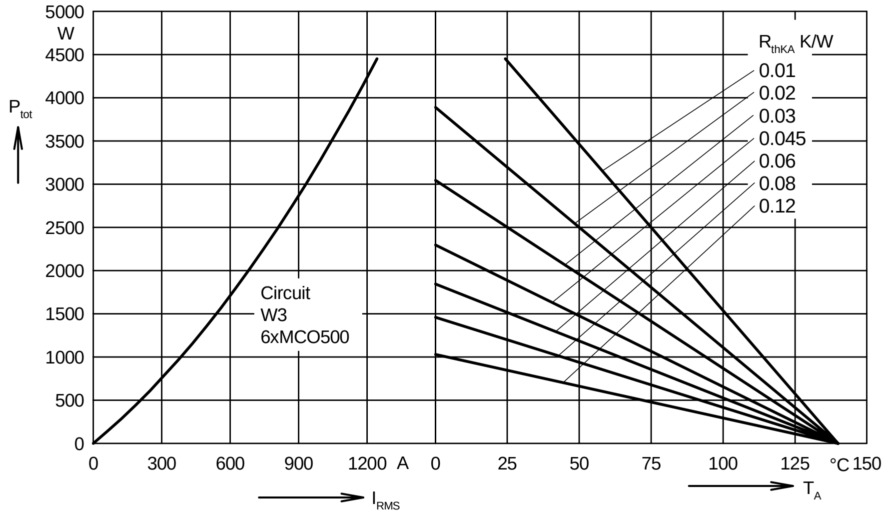


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

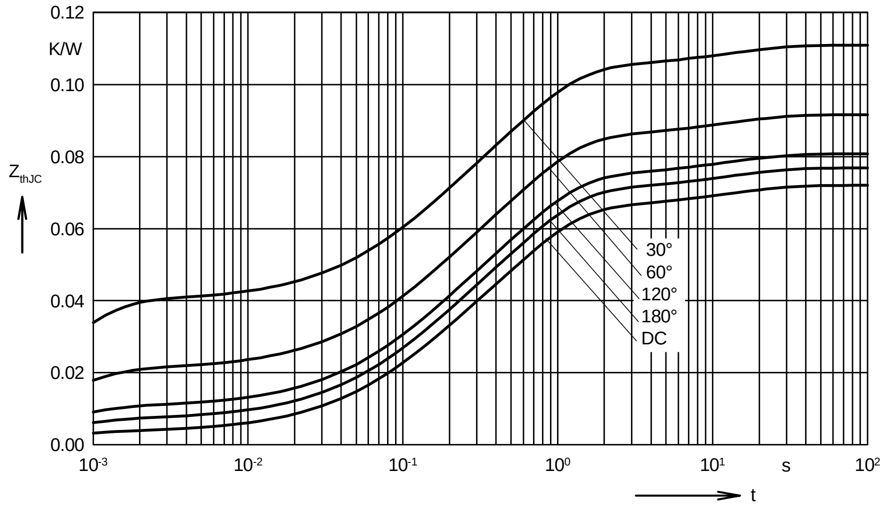


Fig. 9 Transient thermal impedance junction to case (per thyristor)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.072
180°	0.0768
120°	0.081
60°	0.092
30°	0.111

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.0054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12

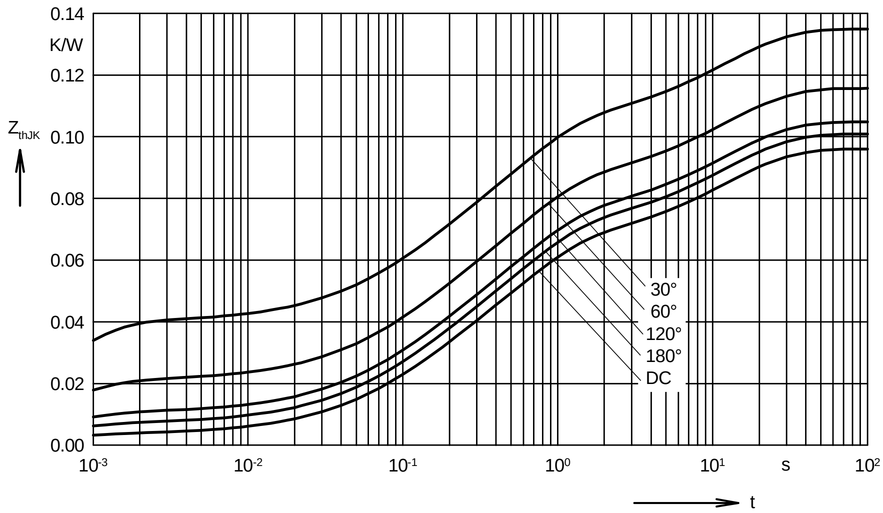


Fig.10 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.096
180°	0.1
120°	0.105
60°	0.116
30°	0.135

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.0054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12
5	0.024	12